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ABSTRACT

The management system developed by the Wisconsin Center for Cognitive Learning (CCL) is useful to principal investigators of individual projects for proposal development, project management, and project reporting, as well as to the CCL management for program planning, program management, and reporting to funding agencies. The system aids proposal development by requiring principal investigators to identify products that will result from an activity and the processes required for that activity. It aids project management by generating monthly or bimonthly budget reports for the principal investigator. By providing detailed accounting and staffing information, the system makes preparation of project progress reports relatively simple. The system is equally useful to the CCL management for program planning as it is for principal investigators. Because the system can provide fiscal reports at nearly any desired level of detail, it also aids program management at the centerwide level. Likewise, the variety of detailed information provided on each project makes it fairly easy for the CCL management to prepare quarterly progress reports for funding agencies on any or all of the center's programs. (Author/JG)

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UTILIZATION OF INFORMATION PROVIDED BY THE WISCONSIN MANAGEMENT SYSTEM

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I shall address the topic of utilization of information provided by our management system from two points of view: (1) that of a principal investigator in the R & D Center and (2) that of a member of the Center's management team. I occupy both roles in the Center, serving as principal investigator of a research project on cost-effectiveness as well as director of the Center.

Utilization of Information As Viewed by a Principal Investigator

The Wisconsin Management System provides useful information for principal investigators in three major areas--proposal development, project management, and project reporting. I would be less than candid if I convey the impression that the management system is viewed with approbation by all principal investigators in the Center, or that all principal investigators find the system to be useful and effective. On balance, however, the management system serves several useful purposes by requiring that principal investigators give systematic attention to identification of the tasks which must be performed, and the sequence in which they must be performed, in order to bring to successful conclusion a research or development project.

Proposal Development

The management system is useful in proposal development because it requires that principal investigators identify the products (such as technical reports or curriculum components) which will result from a given research or development activity and the processes which will be required to bring such an activity to fruition. The product/process dichotomy has proven useful in organizing and explaining the structure and logic of research and development efforts. In many respects our management system is similar to a Gannt chart or a PERT network in that one must identify the specific activities associated with a project, the sequence of activities in a given project, and the schedule which must be followed to accomplish the work within the specified time frame. A page from the Center's 1975 RAMP for the Developing Mathematical Processes project is illustrative (see Figure 34). Note that milestones and the associated tasks are identified. "Materials for Upper-Intermediate Unit" is a milestone; 5.2.23.20.03.01

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and .02 are tasks which must be completed to accomplish milestone 5.2.23.20.C3--Materials for Upper-Intermediate Unit. Program and fiscal planning is carried out one level below the milestone/task level for project and program management purposes. Proposals to funding agencies are detailed only to the milestone/task level, which has proven adequate for all proposals we have prepared to date.

Figure 35 is a page from a proposal submitted to the Bureau of Education for the Handicapped (BEH). BEH specified a somewhat different proposal format than did the National Institute of Education (NIE). However, the management system proved to be sufficiently flexible to meet the proposal requirements specified in the Bureau's RFP. In addition to the descriptive narrative associated with milestones and tasks, most proposals require elaboration of a theoretical construct(s), a literature review, and a research design. These elements of the proposal are dealt with in a narrative section which precedes the identification and description of milestones and tasks.

Budgeting for research and development projects is also facilitated by the use of the Wisconsin Management System. Once milestones, tasks, elements and work packages have been identified, the task of identifying resource requirements is relatively simple. Standard costs developed through historic experience are applied and unique requirements for services and materials are identified. Personnel are budgeted to milestones according to best estimates of the amount of effort that will be required to complete a specified set of tasks.

Project Management

The approach to budgeting employed in our management system makes it easy to provide budget and staffing information for a staff unit and for a project. The staff unit budget includes only those personnel who report directly to the principal investigator of the project. The project budget includes both the costs associated with the project staff unit and any costs associated with support staff units which contribute to the project effort. Figure 36, for example, summarizes a staff unit and project budget for my own research on cost-effectiveness. Budget information is summarized by major categories (e.g., salaries, fringe benefits, travel, etc.), and by milestones. The budget for the cost-effectiveness staff unit is shown at the top of Figure 36. The bottom half of Figure 36 provides a summary for the project showing not only the budget for the staff unit for each milestone, but also the amounts budgeted for support of the project by our data services and media services support staff.

Data generated by the management system also may be used to display project, program and Center staffing commitments. Figure 37 shows the staffing plan for the cost-effectiveness project for the years 1976, 1977 and 1978. These data simplify the task of identifying personnel commitments, particularly for the support staff units such as media services in which

an artist, for example, might provide support for several projects over the course of a year. It also helps identify "crunch" periods when additional limited term employees will be needed to accomplish the projected work.

Monthly or bimonthly budget reports are provided to principal investigators showing the amount budgeted, expended, and encumbered for the project's activities. Summary data is provided to the principal investigator with complete accounting information available from the Business Office.

Project Reporting

The Wisconsin Management System provides data that makes preparation of progress reports relatively simple. Figure 38, for example, was taken from a quarterly report prepared for BEH. The program officer for this project has requested detailed accounting and staffing information on a quarterly basis, as well as progress reports on the status of the work effort. The fiscal and staff data shown in Figure 38 was provided by the management system with minimal problems. Note that the fiscal data is provided according to a set of descriptors developed by BEH which do not represent either milestones or tasks in our management system. Our system was sufficiently flexible, however, to provide these data without reprogramming.

The detailed information which the RAMP provides concerning time schedules for tasks and work packages makes it easy to identify whether or not a project is on schedule and if it is not, to identify those tasks or work packages which require immediate attention. Thus, it facilitates decisions about the reallocation of resources or reordering of priorities when a task is clearly falling behind schedule.

Most principal investigators in the Center were not overly enthusiastic about the management system when it was initiated. The system admittedly imposes constraints greater than those to which most professors are accustomed. Some principal investigators still feel that the system is overly elaborate and represents "over kill." However, a substantial majority of the Center's principal investigators have found the system useful in planning, budgeting, conducting and reporting the status of their project operations.

Utilization of Management System
As Viewed by Center Management

Utilization by Center management of information provided by the management system can be discussed in terms of the three categories--program planning, program management and reporting to funding agencies. The major distinction between uses of information by Center management and uses of information by principal investigators is one of scope rather than substance. Center management must be concerned with the progress and fiscal status of all projects. The management system is capable of providing information helpful in assessing each of these aspects of the Center's program.

Program Planning

The comments made concerning the utility of the management system for principal investigators are equally applicable to Center management. In the case of Center management, however, it is important that there be coordination and integration of projects across programs. This is facilitated by the management system, which makes it possible to build integrated project plans and budgets which may be aggregated across major pieces of work or programs. The management system makes it relatively easy to identify interrelationships between projects in the reading or math areas, for example.

Once a RAMP has been built for a project, the next step is to build a budget by task, milestone, or component according to the prospective funding agency's specifications. Figure 39, for example, illustrates a budget built for NIE for our Developing Mathematical Processes project. Projected expenditures are identified by cost categories for each milestone, and milestone costs are aggregated to produce costs for the project. Figure 40 illustrates a budget built for a proposal submitted to BEH utilizing the budget format prescribed by the funding agency. In both cases, data were obtained from our management system without reprogramming, indicating the flexibility of the system and its ability to accommodate varying information needs. This capability is of great importance, since most prospective funding agencies vary somewhat in their expectations with regard to both proposal and budget formats.

Program Management

The management information system provides several types of information which are useful in program management. The system can, for example, generate a listing of milestones, tasks, elements and work packages with beginning and end dates for each activity. Figure 41 provides an illustration of a computer printout containing such information. Using the information provided by this printout it is easy to check the status of any project.

The management system also is capable of providing fiscal reports on nearly any desired basis. These reports can provide as much detail as one may desire. Generally, summary reports on the fiscal status of each project are adequate to assess whether or not the budget projections are on target. However, in cases where questions arise, accounting information at the milestone or task level is available for detailed study. It is important that accounting information be maintained on both a staff unit and a programmatic basis, since support staff units can charge both personnel and other costs against programmatic activities. Without an accurate accounting system, cost overruns could easily develop unless there is careful monitoring of expenditures by both Center management and the principal investigator of the project. Figures 32 and 33 illustrate a summary fiscal report, while Figure 31 is illustrative of the accounting detail which is available for a given task.

Reporting to Funding Agencies

Funding agencies typically require quarterly progress reports. The preparation of such reports is a relatively simple task given the data available from the management system. The detailed listing of milestone, task, elements and work packages, and the begin and end dates for each of these, provide an efficient means of ascertaining the status of each project. Reports to funding agencies typically identify the milestones which have been completed during a quarter and any exceptions from the projected time frame for accomplishment of specified activities. As is evident from Figure 38, the quarterly progress report can be structured to provide fiscal information in considerable detail if such data are required by the funding agency.

In summary, we have found that the Wisconsin Management System provides an accurate and efficient means of obtaining and maintaining the programmatic and fiscal data needed to assess program progress and budget status. Development of the system is continuing as problems are identified or as new needs become evident. Accurate information depends upon the cooperation of project personnel, who must code expenditures to the appropriate milestone or task and who must report the time they have expended on each milestone or task. We have encountered some difficulty in securing information on time allocations in a timely fashion. Perhaps the biggest problem we have encountered is that of providing timely reports to principal investigators and Center management concerning the fiscal status of each project. Progress is being made in this area, however, and we feel that our management system provides an efficient means of monitoring and controlling complex programmatic research and development activities.